

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

# PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY  
(PCT Rule 43bis.1)

Date of mailing  
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference  
see form PCT/ISA/220

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.  
PCT/GB2004/004405

International filing date (day/month/year)  
18.10.2004

Priority date (day/month/year)  
16.10.2003

International Patent Classification (IPC) or both national classification and IPC  
H01L51/20

Applicant  
CAMBRIDGE UNIVERSITY TECHNICAL SERVICES LTD.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
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**Box No. I Basis of the opinion**

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1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
  - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:
    - ☐ a sequence listing
    - ☐ table(s) related to the sequence listing
  - b. format of material:
    - ☐ in written format
    - ☐ in computer readable form
  - c. time of filing/furnishing:
    - ☐ contained in the international application as filed.
    - ☐ filed together with the international application in computer readable form.
    - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE  
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**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	8,17,19,20,21,29
	No: Claims	1-7,9-16,18,22-28,30-31
Inventive step (IS)	Yes: Claims	
	No: Claims	8,17,19,20,21,29
Industrial applicability (IA)	Yes: Claims	1-32
	No: Claims	

2. Citations and explanations

**see separate sheet**

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**Box No. VIII Certain observations on the international application**

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The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

**Re Item V.**

- 1 Reference is made to the following document:

D1: US 6 008 505, 28 December 1999  
D2: DE 101 53 656, 22 May 2003  
D3: WO 01/47045, 28 June 2001  
D4: WO 01/35500, 17 May 2001  
D5: US2002/0173083, 21 November 2002  
D6: US 6 344 662, 5 February 2002

- 2.0 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1 - 7, 9 - 16, 18, 22 - 24, 26, 28, 30 is not new in the sense of Article 33(2) PCT.

- 2.1 D1 describes a thin film transistor electronic switching device (fig. 3 and col. 4, l. 22 - 32), comprising:
- a source electrode "S" and a drain "D" electrode;
  - a semiconducting region in contact with and extending between the source and the drain electrodes (<-- I -->);
  - a gate electrode "33" disposed for influencing the transconductance of at least part of the semiconducting region; and
  - an insulating region "37" located between the source and the drain electrodes and configured so that the length of the shortest current path through the semiconducting region between the source and the drain electrodes is greater than the shortest physical distance between the source and the drain electrodes.

The subject-matter of device claim 1 and corresponding method claim 18 is not new.

The teaching of D1 also takes away any novel aspect from the subject-matter of dependent claims 2, 10, 11, 15 (intermediate product: fig. 4C), 16, 24, 26 (col. 4, l. 42/43), 28 and 30.

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AUTHORITY (SEPARATE SHEET)**

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- 2.2 The teaching of D2 (paragraph [0042] and fig. 3e) is novelty destroying for the subject-matter of claims 1 - 7, 10- 14, 16, 18, 23, 24, and 28.
- 2.3 The teaching of D3 (p. 21, l. 13 - p. 22, l. 3 and fig. 7) takes away any novel aspect of the subject-matter of claims 1, 5, 6, 10 (p. 25, l. 9), 11, 13, 14, 16, 18, 22, 26, and 28.
- 2.4 The subject-matter of claims 1 and 18 lacks novelty when compared to the teaching of D4 (p. 11, l. 20 - p. 7, l. 7 and fig. 7).
- 2.5 The subject-matter of claims 1 - 4, 9, 10, 11, 13, 15, 16, 18, 23, 24 is not new as regards the teaching of D5 (fig. 7B, paragraphs [0065] and [0069]).
- 3.0 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 8, 17, 19, 20, 21, and 29 does not involve an inventive step in the sense of Article 33(3) PCT.
- 3.1 An organic-inorganic hybrid semiconductor as a material for a channel in a FET and methods of its deposition are known from D6 (col. 6, l. 36 - 42), rendering the subject-matter of claim 8 not inventive.
- 3.2 As there is a known strive for ever smaller devices and device features the skilled person will make the channel as short as possible and thus the selection of a channel length of 1 micrometer as in claim 17 is not inventive.
- 3.3 It is known from D3 to form repellent/non-repellent surfaces for structures deposition of layer. It is not inventive, if the insulator is repellent for the semiconductor as in claims 19 and 20.
- 3.4 The selection of the thickness of the insulating region of 30 nm to 80 nm as in claim 21 is not considered inventive, because these are typical thicknesses for any layer in thin film transistors.

3.5 It is known to deposit insulators from solution (claim 29).

**Re Item VIII.**

4.0 The application does not meet the requirements of Article 6 PCT, because claims 10, 11, 31, 32 are not clear.

4.1 Even if the geometry of the semiconducting channel was such as to have the same length as the shortest distance between source and drain electrodes, the current path would be longer due to scattering effects of the charge carriers.

4.2 A mobility of a semiconducting region as in claim 10 is not known. The unit  $\text{cm}^2/\text{V}$  for the mobility of the semiconducting region in claim 10 is neither known (cf. p. 2, l. 20 - 22). Moreover, it is attempted to define the subject-matter of claim 10 in terms of the result of a specific mobility to be achieved, which merely amounts to a statement of the underlying problem of achieving a high mobility, without providing the technical features necessary for achieving this result.

4.3 The word "substantially" renders claim 11 vague and unclear.

4.4 Claims 31 and 32 are "omnibus" claims and therefore not allowable.